

Zinc and zinc alloys — Optical emission spectrometric analysis

The European Standard EN 12019 : 1997 has the status of a
British Standard

ICS 77.120.60

National foreword

This British Standard is the English language version of EN 12019 : 1997. It supersedes BS 1225 : 1970 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee NFE/8, Zinc and zinc alloys, to Subcommittee NFE/8/4, Analysis of zinc and zinc alloys, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled 'International Standards Correspondence Index', or by using the 'Find' facility of the BSI Standards Electronic Catalogue.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 4, an inside back cover and a back cover.

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Amendments issued since publication

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English version

Zinc and zinc alloys — Optical emission spectrometric analysis

Zinc et alliages de zinc — Analyse par spectrométrie d'émission optique

Zink und Zinklegierungen — Analysenverfahren durch Emissionsspektrometrie

This European Standard was approved by CEN on 26 September 1997.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 209, Zinc and zinc alloys, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1998, and conflicting national standards shall be withdrawn at the latest by April 1998.

Within its programme of work, Technical Committee CEN/TC 209 entrusted CEN/TC 209/SC3, Methods of analysis and testing, to prepare the following document:

EN 12019 *Zinc and zinc alloys — Optical emission spectrometric analysis*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European Standard specifies analytical methods of testing chemical composition of zinc and zinc alloys in accordance with EN 1179, EN 1774, prEN 12844, and EN 988 by optical emission spectrometry.

Included are provisions for preparation of test pieces of zinc and zinc alloys.

2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 1774	<i>Zinc and zinc alloys — Alloys for foundry purposes — Ingot and liquid</i>
prEN 12844	<i>Zinc and zinc alloys — Castings — Specifications</i>
EN 12060	<i>Zinc and zinc alloys — Method of sampling — Specifications</i>
EN 988	<i>Zinc and zinc alloys — Specifications for rolled flat products for building</i>
EN 1179	<i>Zinc and zinc alloys — Primary zinc</i>

3 Definitions

For the purposes of this standard the following definitions apply.

3.1 ingot

Cast product intended for remelting (EN 1179 : 1995).

3.2 batch

Number of ingots taken from a single cast (EN 1179 : 1995).

3.3 cast

3.3.1 cast for non-continuous casting

Product of one furnace, or crucible melt (EN 1179 : 1995).

3.3.2 cast for continuous casting

Identified volume of liquid metal (EN 1179 : 1995).

3.4 sample

Portion of the product, representative of its chemical composition.

3.5 test piece

Final form of the material submitted for analysis.

3.6 optical emission spectrometry

Measurement of the intensity of electromagnetic radiations emitted by the components of the sample when excited. Each element emits radiation of well defined and specific wavelength and its intensity is linked to its concentration.

4 Sampling

Sampling shall be in accordance with EN 12060.

5 Preparation of test pieces

Test pieces shall be prepared so that they are suitable for optical emission spectrometry. Shape and size of test pieces are dependent upon device and apparatus used. The surface of test pieces shall be prepared according to requirements given in the operation manual of the apparatus used.

6 Testing

6.1 General

The test shall be carried out by optical emission spectrometry using solid test pieces prepared according to clause 5. For the analysis of the impurities and alloying elements in zinc and zinc alloys as defined in EN 1179, EN 1774, prEN 12844 and EN 988 by optical emission spectrometry, different analytical lines can be used. A selection of the wavelengths of analytical lines is listed in annex A. Which one of the different analytical lines to be used is influenced by the analytical program and the type of instrument.

The reproducibility of the apparatus used shall be in accordance with the values given in annex B.

6.2 Calibration

The apparatus used shall be capable and suitable for the detection and determination of all elements specified in the relevant material standard (see clause 6).

The device shall be calibrated within a reasonable time in accordance with the procedures described in the operation manual. As samples, certified reference materials (CRM) shall be used primarily, reference materials (RM) secondarily and internal reference materials (IRM) last of all.

The reference material used for calibrating the device shall have similar physical and chemical properties to the sample to be analysed.

6.3 Method of testing

In general each test piece shall be tested at least two times. If heterogeneity or malfunction of the spectrometer are suspected additional tests shall be performed on the same sample with a new surface.

6.4 Expression of results

Test results shall be given as mass fraction, calculated as the arithmetic mean of all valid single results of the test sequence according to 6.3 excluding failing single test.

Results shall be expressed as defined in EN 1179, EN 1774, prEN 12844 and EN 988.

6.5 Test report

The test report shall include the following items:

- identification of sample;
- test result of each test sequence according to 6.4;
- name of laboratory or testing organization;
- date of test;
- number of this European standard (EN 12019);
- signature of the laboratory manager or other responsible person.

Annex A (informative)

Selection of analytical lines

Analytical lines (nm) for analysis of zinc and zinc alloys by optical emission spectrometry.

Element	Analytical lines nm
Zn	267,05 481,05 250,20
Pb	405,78 363,90 283,31
Cd	228,80 226,50 361,05 214,41
Fe	302,06 371,99
Cu	327,30 296,10 324,75 510,55 550,50 200,00
Sn	317,50
Al	396,15 308,22 394,40 256,70 266,00
Si	288,15
Mg	285,20 279,08 382,93
Ni	341,48
Cr	426,43 425,40
Ti	368,52 365,35 337,20 324,19

Annex B (normative)

Reproducibility

Table B.1 shows typical coefficients of variation of analysis result, obtained from interlaboratory tests and representing the mean of 10 measurements per test piece.

Element	Content % (m/m)	Coefficient of variation
Pb	0,01	4
Cd	0,01	3
Sn	0,01	4
Fe	0,01	4
Cu	0,001	2
Al	0,001	4
Al	4,0	2
Mg	0,1	3
Si	0,01	3
Ni	0,01	3
Ti	0,1	3
Cr	0,001	4

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